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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,529	04/01/2004	Scott D. Brandenburg	DP-311272	1574

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DOUGLAS D. FEKETE
DELPHI TECHNOLOGIES, INC.
Legal Staff, Mail Code: 480-410-202
P.O. Box 5052
Troy, MI 48007-5052

EXAMINER

CAO, PHAT X

ART UNIT PAPER NUMBER

2814

DATE MAILED: 12/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/815,529

Applicant(s)

BRANDENBURG ET AL.

Examiner

Phat X. Cao

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-19 is/are pending in the application.
- 4a) Of the above claim(s) 10-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The cancellation of claim 2 in Paper filed on 9/22/05 is acknowledged.
2. This application contains claims 10-19 drawn to an invention nonelected with traverse in Paper No. 2/2/05. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Objections

3. Claim 3 is objected to because of the following informalities: line 2, "he" should be changed to "the". Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 3-6 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glenn et al (US. 6,571,466) in view of Chason et al (US. 6,800,946).

Regarding claims 1, 5 and 9, Glenn (Fig. 4) discloses a microelectronic assembly comprising: a substrate 102 formed of a glass transparent material (column 8, lines 44-47 and lines 55-57), an integrated circuit die 104 having an active face facing the

substrate 102 and a rear face 104U opposite the active face, the active face including a central region and a perimeter region about the central region, a plurality of bump interconnections 112 attaching the integrated circuit die 104 to the substrate 102

such that the active face is spaced apart from the substrate 102 by a gap 118, an epoxy encapsulant 116 (column 10, lines 47-48) about the integrated circuit die 104 on the substrate 102, overlying the rear face 104U of the die 104 (also see column 10, lines 31-35), and extending within the gap 118 to encapsulate the bump interconnections 112, and an optical window 120 defined by the encapsulant 116 within the gap 120 between the central region 118 and the substrate 102. It is noted that the process limitation (formed by molded) recited in a "product by process" claim would not carry patentable weight in a claim drawn to structure because distinct structure is not necessarily produced. In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985).

Glenn does not disclose that the epoxy encapsulant 116 is a polymeric encapsulant.

However, Chason (Fig. 2) teaches the encapsulant 240 formed between the chip 210 and the glass substrate 230, and made of either epoxy or polymeric material (column 6, lines 56-64). Accordingly, it would have been obvious to form the encapsulant 116 of Glenn with either epoxy or polymeric material because such encapsulant materials are well known and commonly used for providing the bond strength and strain relief between the chip and the substrate, as taught by Chason (column 4, lines 35-39).

Regarding claim 3, Glenn (Fig. 4) further discloses that the central region of the die 104 comprises an optical feature 106 adapted for detecting/emitting optical signals through the substrate 102 (column 8, lines 44-47).

Regarding claim 8, Glenn (Fig. 4) further discloses that the bump

interconnections 112 are bonded to the die 104 at the perimeter region and to the substrate 102.

Regarding claims 4 and 6, Chason (Fig. 2) also teaches that the polymeric encapsulant 240 is opaque (column 8, lines 29-31), and composed of an epoxy polymer filled with an inorganic filler (glass) (column 7, lines 33-40) for improving thermal expansion characteristics of the polymeric encapsulant (column 6, lines 56-58).

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Glenn et al and Chason et al as applied to claim 1 above, and further in view of Gonzalez et al (US. 2003/0080437).

As discussed in details above, the combination of Glenn and Chason substantially reads on the above claim. Chason (Fig. 2) further discloses that the substrate 230 is formed of glass (column 6, lines 8-11) and the encapsulant 240 is a polymeric filled with inorganic filler (column 7, lines 33-40).

Chason does not disclose that the polymeric encapsulant 240 has a thermal expansion coefficient (CTE) in a range as claimed.

However, Gonzalez (Fig. 6) teaches the forming of inorganic filler encapsulant 116 (par. (0038J) between the chip 130 and the FR-4 glass substrate 110 (par. (0040)). The inorganic filler encapsulant 116 has lower CTE and has relatively closer CTE match to the chip 130 and the substrate 110 by adding a suitable amount of inorganic filler in a range of 0% to 80% by weight (par. (0039) and par. (0040)). Accordingly, it would have been obvious to adjust the thermal expansion coefficient (CTE) of the filler encapsulant 116 in a range as claimed for providing the closer CTE

match between the chip and the substrate because the CTE of the filler encapsulant can be controlled depending upon the CTE of the glass substrate and depending upon the amount of filler (0% to 80%) added to the encapsulant, as taught by Gonzalez (par. (0040)).

Response to Arguments

6. Applicant argues that “nothing in Glenn et al. shows an overmolding process to encapsulate the die within a polymeric body.” (page 11 of remark).

This argument is not persuasive because these claims are directed to the product, no matter how it is actually made, and the patentability of the final product must be determined, not the patentability of the process, which in any case have not been presented in “product by process” claims. *In re Thorpe*, 227 USPQ 964 (Fed. Cir. 1985). In this case, the process limitation of forming encapsulant by “molded” does not carry patentability weight in claims drawn to structure because the final structure of the encapsulant formed by “molded” process as claimed is not different from the encapsulant structure as disclosed by Glenn. Furthermore, forming an encapsulant to cover an integrated circuit die by “molded” process is well known and commonly used in the packaging technology for encapsulating the integrated circuit chips.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phat X. Cao whose telephone number is 571-272-1703. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PC
December 9, 2005


PHAT X. CAO
PRIMARY EXAMINER